Study Name: Comparison of desiccation timing and harvest method in canola (0741)

Objectives: Determine the optimum timing to apply a desiccant and compare straight cutting vs. swathing at 7 and 14 days after applying the desiccant.

Results:
A study evaluating the use of desiccants as a harvest aid in canola was conducted at three locations in 2005, 2006, and 2007: 1) North Central Research Extension Center, Minot, ND, 2) Langdon Research Extension Center, Langdon, ND, and 3) Montana State University, Bozeman, MT. The objectives of the study were to: 1) determine the effect of paraquat applied preharvest at three timings on canola yield, seed moisture, and seed quality, 2) determine the effect of diquat applied preharvest at three timings on canola yield, seed moisture, and seed quality, 3) compare yield, seed moisture, and seed quality of swathed canola to paraquat and diquat-treated canola, and 4) determine the effect of harvest timing following a paraquat or diquat application on canola yield, seed moisture, and seed quality. Paraquat and diquat were applied preharvest at three timings (early, optimum swath timing, and late). Paraquat was applied at 1.3 pt/A with NIS at 0.25% v/v. Diquat was applied at 1.5 pt/A with NIS at 0.25% v/v. One treatment was swathed with a plot swather on the same days the paraquat/diquat treatments were applied as a comparison to current grower practices. The paraquat, diquat, and swath treatments were harvested 7 and 14 days after treatment (DAT). The study was a 3-factor factorial (desiccant, timing, harvest date) arranged in a randomized complete block design. In Minot, paraquat- and diquat-treated plots produced similar canola yields compared to swathed treatments averaged across all timings and harvest dates. Canola yields were also similar for the 2 harvest dates averaged across desiccants and timings. Additionally, there were no significant differences in test weight and oil content between desiccated or swathed canola averaged across all timings and harvest dates. Seed lost due to pre-harvest shattering was less than 37 lb/A for any either desiccant or swathing. This loss would likely be considered minimal in canola production. At Langdon in 2005 and 2006, paraquat- and diquat-treated plots produced similar canola yields and seed weight compared to swathed treatments averaged across all timings and harvest dates. However, in 2005, the later desiccant/swath timing produced higher yield and seed weight than timing 2, which in turn, was higher than timing 1. Also, canola harvested 14 DAT yielded higher than that harvested 7 DAT. This is probably because of higher seed moisture at the first two application/swath timings where seed was less physiologically mature compared to the Minot location. In 2006, yield and seed weight results were similar for desiccants and timings. Seed lost due to pre-harvest shattering was less than 59 lb/A for any either desiccant or swathing. At Bozeman in 2005 and 2006, paraquat- and diquat-treated plots generally produced similar canola yield and test weight compared to swathed treatments averaged across all timings and harvest dates. Canola yields were also similar for the 2 harvest dates averaged across desiccants and timings. However, in 2005, canola swathed or desiccated at the third or latest timing produced higher yield than canola treated at the two earlier timings. Additionally, all canola desiccated or swathed at the earliest timing had a significantly lower test weight than canola desiccated or swathed at the later two timings. Furthermore, canola harvested 7 DAT had a lower test weight than canola harvested at 14 DAT. This may be due to lack of physiological maturity at earlier desiccation/swath timings. However, in 2006, canola yield and test weight was slightly lower at the latest timing. Test weight was slightly lower when harvested 14 DAT compared to 7 DAT. Seed lost due to pre-harvest shattering in 2005 was less than 59 lb/A for any either desiccant or swathing, but was 112-193 lb/A in 2006. For Minot in 2007, the data look mostly similar to 2005 and 2006; however, total damage was higher in 2007 primarily due to heat damage. July was extremely hot and dry with several days in the high 90's and some days over 100 degrees.

Table 1. Canola yield and quality at Minot, ND (2005).

	Application Moisture	Harvest Moisture	Yield	Test weight	Oil content	Seed loss	Green count	Total damage	Grade
	%	%	lb/A	lb/bu	%	lb/A	%	%	
Paraquat		10.7 a	2525 a	53.6 a	42.9 a	37 a	0.6 b	0.8 b	1.5 a
Diquat		10.1 b	2519 a	53.6 a	43.1 a	24 b	1.6 a	1.7 a	1.5 a
Swath		10.0 b	2526 a	53.5 a	42.7 a	18 b	0.5 b	0.6 b	1.2 a
Timing 1	40.7	9.5 b	2573 a	53.5 a	43.2 a	21 b	1.7 a	1.7 a	1.4 a
Timing 2	34.5	11.8 a	2331 b	53.6 a	42.8 a	17 b	0.5 b	0.6 b	1.3 a
Timing 3	23.3	9.4 b	2667 a	53.5 a	42.6 a	40 a	0.6 b	0.8 b	1.5 a
7 DAT		10.4 a	2505 a	53.6 a	43.0 a	19 b	1.4 a	1.5 a	1.4 a
14 DAT		10.1 a	2541 a	53.6 a	42.7 a	33 a	0.5 b	0.6 b	1.4 a

Table 2. Canola yield and quality at Minot, ND (2006).

	Application Moisture	Harvest Moisture	Yield	Test weight	Oil content	Seed loss	Green count	Total damage	Grade
	%	%	lb/A	lb/bu	%	lb/A	%	%	
Paraquat		8.7 b	2401 a	53.2 a	45.8 b	19 a	0.7 ab	0.9 ab	1.0 b
Diquat		8.8 b	2503 a	53.2 a	46.5 a	17 a	1.0 a	1.3 a	1.1 a
Swath		9.3 a	2352 a	52.9 b	45.8 b	19 a	0.5 b	0.8 b	1.0 b
Timing 1	42.9	9.0 a	2375 a	52.9 b	45.6 b	17 a	0.8 a	1.0 a	1.0 a
Timing 2	39.5	9.2 a	2412 a	53.1 ab	46.0 ab	19 a	0.8 a	1.1 a	1.1 a
Timing 3	36.7	8.6 b	2468 a	53.2 a	46.4 a	20 a	0.5 a	0.9 a	1.0 a
7 DAT		9.8 a	2425 a	52.9 b	46.1 a	7 b	1.0 a	1.3 a	1.1 a
14 DAT		8.1 b	2412 a	53.2 a	45.9 a	30 a	0.4 b	0.7 b	1.0 a

Table 3. Canola yield and quality at Minot, ND (2007).

	Application Moisture	Harvest Moisture	Yield	Test weight	Oil content	Seed loss	Green count	Total damage	Grade
	%	%	lb/A	lb/bu	%	lb/A	%	%	
Paraquat		9.6 a	1337 a	52.5 a	38.9 a	25 a	1.2 a	2.7 a	2.9 a
Diquat		9.6 a	1357 a	52.5 a	38.8 a	17 ab	1.3 a	3.0 a	3.1 a
Swath		8.9 b	1382 a	52.4 a	38.7 a	16 b	0.9 a	2.5 a	3.0 a
Timing 1		9.8 ab	1236 b	51.8 c	38.4 b	4 c	2.4 a	4.1 a	2.9 a
Timing 2		8.2 b	1428 a	52.5 b	39.2 a	19 b	0.6 b	2.2 b	3.0 a
Timing 3		10.1 a	1412 a	53.0 a	38.9 a	36 a	0.4 b	1.9 b	3.1 a
7 DAT		9.8 a	1390 a	52.1 b	39.0 a	6 b	1.5 b	2.9 a	2.9 a
14 DAT		8.9 b	1327 a	52.8 a	38.7 a	33 a	0.8 a	2.5 a	3.1 a